"Available water from imported sources may be reduced in the future as other users and uses place greater demands on these sources."

Air Quality

Why is this important?

Good air quality is vital for the health of residents, nature and the economy. Human health effects of air pollution can range from lung irritation to cancer and premature death. Ecological effects include damage to crops and contamination of waters. Degradations in human and ecological health often adversely impact economic well-being.

How are we doing?

The SCAG region includes four air basins: South Coast, Mojave Desert, Salton Sea and South Central Coast (Ventura County portion) (see Map next page). The South Coast Air Basin includes an area of approximately 6,480 square miles with more than 15 million residents in 2004, about 85 percent of the region's total population. It includes all of Orange County and the non-desert areas of Los Angeles, Riverside and San Bernardino counties. The Salton Sea and the Mojave Desert air basins have a combined area of approximately 32,200 square miles. The two basins include the desert portions of Los Angeles, Riverside and San Bernardino counties as well as Imperial County. Ventura County is part of the South Central Coast Air Basin (SCCAB).

Air quality is a function of both the rate and location of pollutant emissions under the influence of meteorological conditions and topographic features.[1] Air masses can move from basin to basin. As a result, pollutants such as ozone and particulate matter can be transported across air basin boundaries.

The U.S. Environmental Protection Agency, shortly after its creation in 1970, developed regulations targeting six "criteria" pollutants


AIR BASINS
in the SCAG Region
MDAB
SCAB
SSAB
VC SCCAB
South Central Coast Air Basin
Ventura
Los Angeles
South Coast Air Basin
Orange
San Bernardino
Mojave Desert Air Basin
Riverside
Salton Sea Air Basin
Imperial
San Diego
Mexico
Arizona
Nevada
PACIFIC
OCEAN

that adversely affect human health and welfare: ozone, particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. Of these, the first three pollutants are regionally significant, with various parts of the SCAG region showing moderate to extreme levels of pollution except for carbon monoxide in the last couple years. Because of their significance, this report focuses on the first three pollutants.

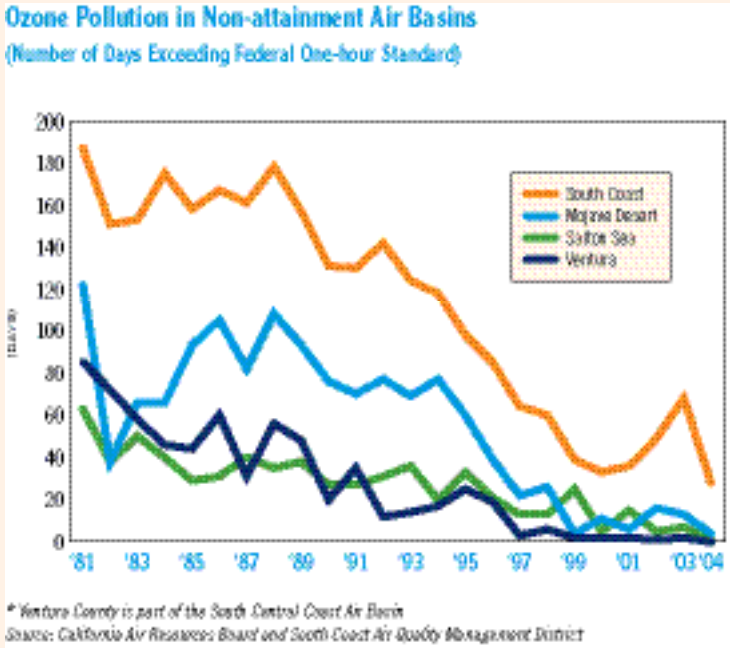
Air pollution consistently ranks high among public concerns in Southern California, and control efforts have been a high priority in recent decades. Despite significant improvements in the past two decades, the South Coast Air Basin still has some of the worst air quality in the nation in terms of the annual number of days exceeding federal standards.

Ozone

Currently, all four air basins in the region are designated as non-attainment areas for Ozone. Ozone is a colorless, poisonous gas. Ground level ozone is a major component of urban and regional smog. Ozone is a strong irritant, which can reduce lung function and aggravate asthma as well as lung disease. Repeated short-term ozone exposure may harm children's developing lungs and lead to reduced lung function in adulthood. In adults, ozone exposure may accelerate the natural decline in lung function as part of the normal aging process.[2]

In 2004, partly due to cooler weather and weak atmospheric inversions, ozone pollution improved in all four air basins in the region, particularly for the South Coast Air Basin (Figure 52). *In the most populous South Coast Air Basin, the number of days exceeding the federal one-hour ozone standard from 2003 to 2004 decreased from 68 days to 28 days, the lowest since 1976.* This followed the significant increases from 36 to 68 days between 2001 and 2003. The number of days for health advisories in the South Coast Air Basin also decreased from 36 to 4 days between 2003 and 2004.[3]

Figure: 52



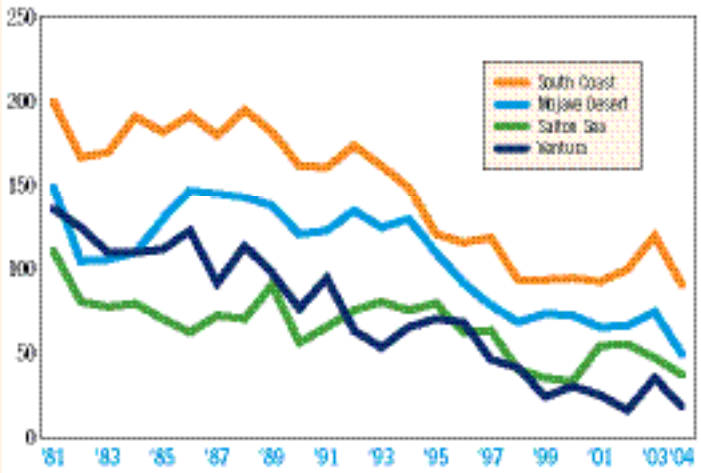
Within the region, the Santa Clarita Valley surpassed the federal one-hour ozone standard for a total of 13 days in 2004 followed by the East San Bernardino Valley with 12 days of exceedance.[4] The maximum 1-hour ozone concentration in the South Coast Air Basin also decreased from 0.194 ppm (parts per million parts of air) in 2003 to 0.163 ppm in 2004, also the lowest since 1976.[5]

Ozone is not directly emitted, but is formed when volatile organic compounds (VOCs) and oxides of nitrogen (NOx) emissions react in the presence of sunlight. In both 2002 and particularly 2003, the much hotter weather associated with a persistent high-pressure system trapped ozone gases at lower altitudes and contributed to the sharp increase of ozone pollution. In 2004, an unseasonably cool weather and weak atmospheric inversions contributed to the significant reduction of ozone pollution.

Beginning in June 2005, transportation investment must conform to the new 8-hour ozone standard. In 2004, the South Coast Air Basin exceeded the federal 8-hour standard by 90 days, a significant decrease from 120 days in 2003 and once again the lowest since 1976 (Figure 53). The other three basins in the region all achieved reductions in the number of days exceeding the federal 8-hour standard during 2004. For example, in the Mojave Desert Air Basin, the number of days exceeding the federal 8-hour standard declined from 74 days to 49 days between 2003 and 2004.

Figure 53

Ozone Pollution in Non-attainment Air Basins
(Number of Days Exceeding Federal 8-hour Standard)



* Ventura County is part of the South Central Coast Air Basin
Source: California Air Resources Board and South Coast Air Quality Management District

PM_{10}

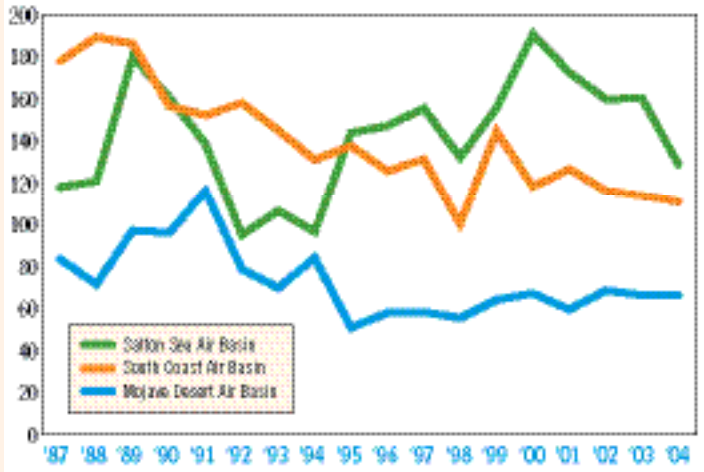
PM_{10} is particulate matter with diameter of 10 microns or smaller. Exposure to particulate matter aggravates a number of respiratory illnesses and may even cause early death in people with existing heart and lung disease. Both long-term and short-term exposure can have adverse health impacts.

Particulate matter can be directly emitted into the air in the form of dust and soot. In addition, similar to ozone, secondary particles can be formed in the atmosphere from the reaction of gaseous precursors such as oxides of nitrogen (NOx), oxides of sulfur (SOx), reactive organic gases (ROG) and ammonia. Secondary particles are more easily formed in the atmosphere during colder winter conditions. On an annual basis, directly emitted PM_{10} emissions contribute approximately 65 percent of the ambient PM_{10} in the South Coast Air Basin.

Three air basins in the region have been designated as non-attainment areas for PM_{10}, including the South Coast, Salton Sea and Mojave Desert. The annual average indicator provides a measure of long-term exposure to particulate matter that could contribute to breathing disorders, reduce lung function, and curtailed lung growth in children.

Since 1987, the South Coast Air Basin has been exceeding the Federal annual average standard of 50 ug/m^3 (micrograms per cubic meter of air) but with a trend toward improvement (Figure 54). In 2004, there

Figure 54



was only a slight reduction from 2003 in the PM_{10} annual average in the South Coast Air Basin. Exceedances of the federal annual standard in the South Coast Air Basin were confined to Riverside County with a maximum of 55.5 ug/m³ (or 111 percent of the federal standard).[6]

In the Salton Sea Air Basin, the PM_{10} pollution level has been fluctuating since 1987. The Salton Sea Air Basin has contained the highest level of PM_{10} annual average within the SCAG region since 1995. Between 2003 and 2004, the annual average of PM_{10} pollution in the Salton Sea Air Basin dropped significantly from 60 percent to about 30 percent over the federal standard. In the Mojave Desert Air Basin, PM_{10} pollution level has been below the federal annual average standard since 1992.

In 2004, the number of days exceeding the federal 24-hour standard (150ug/m³) for PM_{10} decreased in all three non-attainment basins, partly due to cooler weather and an early start of the rainy season. The number of days with an unhealthy level of PM_{10} describes the chronic extent of PM_{10} pollution. Neither the South Coast nor Majave Desert Air Basin had any exceedance in 2004. Only the Salton Sea Air Basin experienced 13 days of exceedance of the federal 24-hour standard, a decrease from 28 days from 2003 (Figure 55).

Figure 55

PM_{10} Pollution in Non-attainment Air Basins

Days Exceeding Federal PM_{10} 24-hour Standard

AIR BASINS	2002	2003	2004
South Coast	0	6	0
Mojave Desert	6	8	0
Salton Sea	13	28	13

Source: California Air Resources Board

California state standards for PM_{10} are significantly more stringent than federal standards due to greater consideration given to the potential health impacts. Specifically, the state annual average standard for PM_{10} of 20 ug/m³ is only 40 percent of the federal standard of 50 ug/m³. In 2004, both the Salton Sea and South Coast air basins continued to significantly exceed the state annual average standards. In addition, the state 24-hour standard for PM_{10} of 50 ug/m³ is only a third of the federal standard of 150 ug/m³. In 2004, the Salton Sea Air Basin ex-

ceeded the state standard on 220 days, while the South Coast Air Basin exceeded on 210 days.[7]

$PM_{2.5}$

$PM_{2.5}$ is a subgroup of finer particles within the classification of PM_{10}. They pose increased health risks because they can penetrate deeper in the lung than PM_{10} and contain substances that are particularly harmful to human health. The U.S. EPA promulgated national $PM_{2.5}$ standards in 1997.

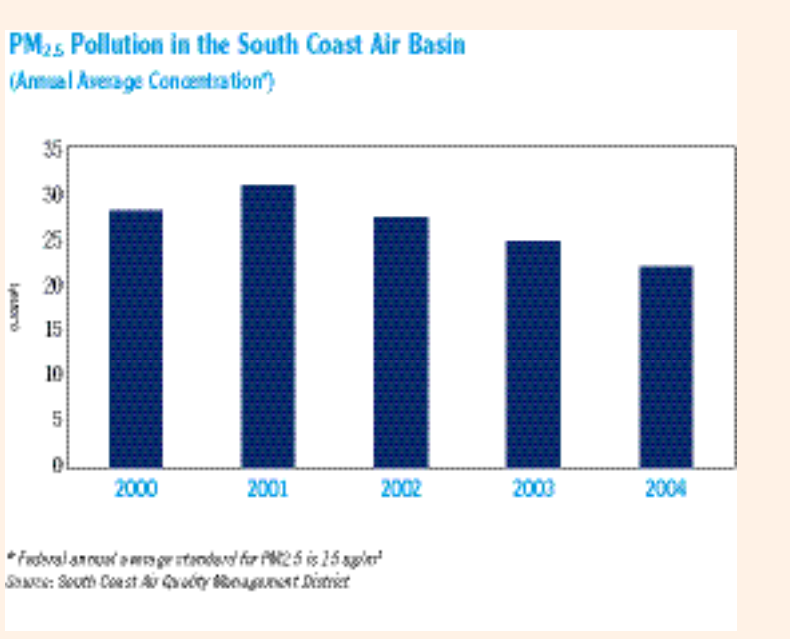
While the annual average concentration of 22.1 ug/m³ in the South Coast Air Basin declined in 2004 from the previous year (24.9 ug/m³), it continued to exceed the federal standards of 15 ug/m³.[8] Specifically, 15 of the 19 monitoring stations in the basin showed exceedance, ranging from coastal cities to inland valleys. Nevertheless, the annual average $PM_{2.5}$ concentration in the South Coast Air Basin in 2004 was the lowest since monitoring began in 1999.

$PM_{2.5}$ concentrations, like PM_{10}, were high in the inland valley areas of San Bernardino and Riverside counties. However, $PM_{2.5}$ concentrations were also high in the metropolitan areas of Los Angeles and Orange counties. The high $PM_{2.5}$ concentrations in these areas are mainly due to the secondary formation of smaller-sized particulate resulting from mobile and stationary source activities.

$PM_{2.5}$ particles on average are smaller than PM_{10} particles and are more difficult to control. In 2004, while the South Coast Air Basin did not have any exceedance of the federal 24-hour standard for PM_{10}, it exceeded the federal 24-hour standard for $PM_{2.5}$ on 7 days, a decrease from 14 days in 2003.

On an annual basis, directly emitted $PM_{2.5}$ emissions contribute approximately 40 percent of the ambient $PM_{2.5}$ in the South Coast Air Basin. Among the directly emitted $PM_{2.5}$ emissions, close to 60 percent are from areawide sources, while 30 percent are from mobile sources and another 10 percent are from stationary sources.

Figure 56



Carbon Monoxide

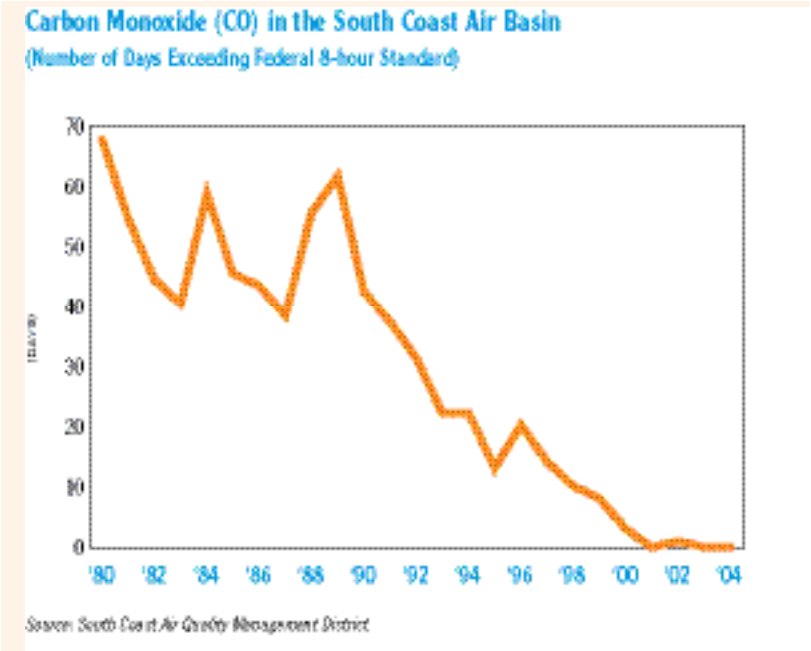
Carbon monoxide is a colorless and odorless gas that is directly emitted as a product of combustion. Incomplete combustion will result in increased carbon monoxide emissions. Motor vehicles generate almost 85 percent of carbon monoxide emissions in the region. Since 1975, total emissions of carbon monoxide in the South Coast Air Basin have been reduced by almost 70 percent even though vehicle miles traveled

have been increasing. On-road motor vehicle emission controls have been primarily responsible for this significant improvement.

Carbon monoxide impairs the ability of blood to carry oxygen. It is especially dangerous to infants, the elderly and people with heart or respiratory problems. Exposure to high levels of carbon monoxide can result in headaches, dizziness, fatigue, slow reflexes and death.

In 2002, the South Coast Air Basin met federal attainment standards for carbon monoxide (with no violation in 2001 and the one day allowable exceeding the federal standard in 2002). The basin continued to have no violation for carbon monoxide in 2003 and 2004. In the past two decades, peak 8-hour carbon monoxide levels also decreased in the South Coast Air Basin from 26 ppm in 1980 to 6.7 ppm in 2004 in south central Los Angeles County.[9]

Figure 57



Source: South Coast Air Quality Management District

Water Resources

Total Water Use

Why is this important?

Water is essential to human life. With the continuing increase of population in the region, ensuring reliable water resources to meet demand and maintaining water quality are vital goals for all of Southern California. In addition, how water is used would also impact the health and sustainability of the regional ecosystem.

How are we doing?

Southern California depends on both imported and local sources to meet its demand for water. This includes imported water from the Colorado River, the State Water Project via the California Aqueduct, and eastern Sierra Nevada via the Los Angeles Aqueduct. *Together, depending on the rainfall level, imported water generally accounts for about 70 to 75 percent of the regional water supply.* The remaining 25 to 30 percent comes from local surface and ground water and from reclaimed water sources.[10] *It is important to note that available water from all three imported sources may be reduced in the future as other users and uses place greater demands on these sources*. For example, environmental and water quality needs in the Delta, Colorado River and Owens River/Mono Basin systems affect import water supply quantity, quality and reliability. In addition, the region also needs to assess and plan for impacts of climate variations and global climate change.

Within the SCAG region, the Metropolitan Water District (MWD) is the largest urban water supplier. Its service area includes close to 15

million residents in the region (Figure 58). In recent years, MWD has provided about half of the municipal, industrial and agricultural water used in its service area.

Figure 58

Population Within Water District Service Area

COUNTY	MWD	Non-MWD
Imperial	0%	100%
Los Angeles	92%	8%
Orange	100%	0%
Riverside	72%	28%
San Bernardino	41%	59%
Ventura	72%	28%
REGION	85%	15%

Source: Metropolitan Water District

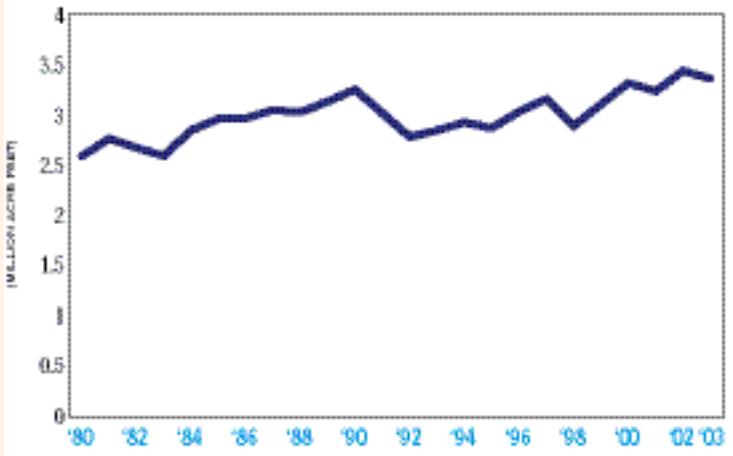
In 2003, total water consumption at 3.4 million acre-feet represented a 2.2 percent decline from 2002. The 2003 level was only slightly higher (or 3.2 percent) than the 1990 level, despite an increase of almost 2.3 million (16 percent) residents since 1990 (Figure 59). Within the MWD service area in the SCAG region, total water consumption did not experience significant increases for several years in the mid-1990s due to the recession, wet weather, conservation efforts, and lingering drought impacts.

Of total consumption, only 7.5 percent was for agricultural purposes and the rest was for urban (municipal and industrial) uses. The sources of water supplies for irrigation operations differ throughout the region. Groundwater is the primary source of water for the agricultural activities on the coastal plain of Ventura County. In Los Angeles and Orange counties, combinations of groundwater and imported water are used.

Figure 59

Total Water Consumption*

(Metropolitan Water District Service Area)



*Within the SCAG region. Total water consumption includes municipal/industrial and agricultural uses.
**One acre foot equals 325,851 gallons.

Source: Metropolitan Water District

In recent years, the region has developed an array of local projects to complement imported water supplies. They include surface water storage, groundwater storage and conjunctive use, water recycling, conservation, brackish water desalination, water transfer and storage, and infrastructure enhancements. For example, in 2003, MWD opened Diamond Valley Lake located near Hemet in southwestern Riverside County, the Southland's largest reservoir with a capacity of 800,000

acre-feet. Diamond Valley Lake would provide the region with a six-month emergency supply in case of a major system interruption due to earthquakes or other disasters. In addition, MWD gained three new partners for ground water storage, improving the region's reliability in dry years by arranging for additional storage in wet years.

Finally, when completed, the Inland Feeder will deliver water by gravity to Diamond Valley Lake via nearly 44 miles of tunnels and pipeline that start at Devil Canyon and tie into the Colorado River Aqueduct and eastside Pipeline. The Inland Feeder Project will enhance system reliability by linking the State Water Project and Colorado River systems and will improve water quality by allowing greater blending of SWP and Colorado River waters.

Per Capita Urban Water Use

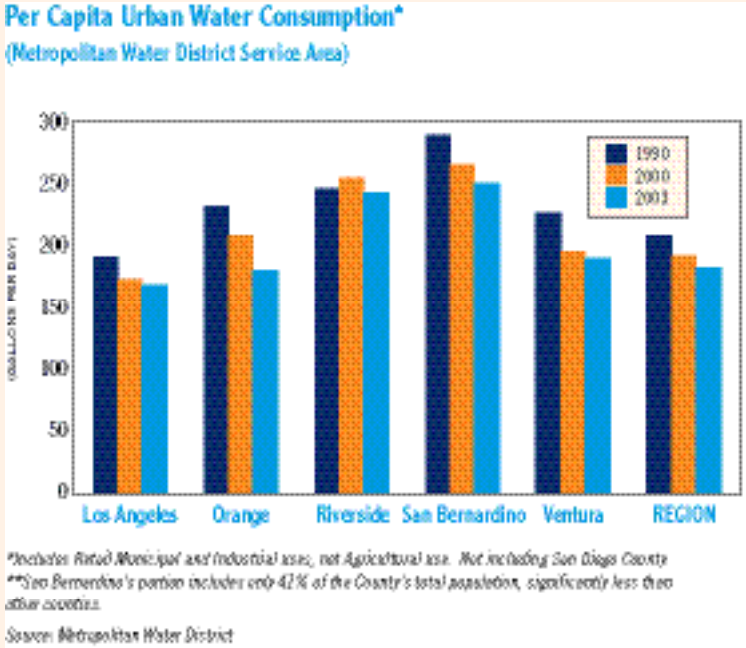
Why is this important?

Water consumption per capita is important when looking at a city or county's growth projections in order to maintain a safe yield per person and sustain community well-being.

How are we doing?

Per capita water consumption for urban uses has generally been declining since 1990. Within the MWD service area it decreased from 210 gallons in 1990 to 193 gallons in 2002 and 184 gallons in 2003 (Figure 60). Between 2000 and 2003, per capita water consumption decreased in all five SCAG counties within the MWD service area, particularly Orange, Riverside and San Bernardino. Urban water use includes residential, commercial, industrial, fire fighting and other uses. Hence, per capita urban water use consists of more than the amount of water used directly by an individual.

Figure 60



An important factor contributing to the overall decline in per capita urban water consumption is the development of various conservation programs and practices. These include retrofitting with water efficient technology for showerheads and toilets and changing landscaping practices toward drought-tolerant plants. In addition, implementation of new water rate structures has helped suppress growth in per capita water demand.

In Southern California, much of the variation in per capita water use among counties can be attributed to climate differences. Within the region, the Inland Empire counties continued to maintain higher per capita urban water consumption rates than coastal counties. For example, in 2003, per capita urban water consumption per day in San Bernardino and Riverside counties was 252 and 245 gallons respectively in contrast to 182 gallons in Orange County and 170 gallons in Los Angeles County. This partly reflects higher landscape water use due to warmer and dryer climate conditions. In addition, a single family unit has higher per capita water use than a multi-family unit. The Inland Empire has much higher share (72 percent) of single-family residential units than Los Angeles County (55 percent) or Orange County (63 percent).

Beach Closure

Why is this important?

When the ocean waters off a beach contain high concentrations of certain bacteria, they become unsafe for swimming and other recreational uses. In 1999, the California Department of Health began monitoring all beaches which have more than 50,000 annual visitors and have outflows from storm drains, rivers, or creeks. Closures or advisories are issued for beaches that fail to meet the state's standards for various sources of bacterial pollution.

How are we doing?[11]

Between 2003 and 2004, the total number of beach closing/advisory days decreased from 3,508 to 2,860 among the 98 beaches monitored in the region. The decrease of 18 percent of beach closing/advisory days was less than that at the state level during the same period, from 5,384 to 3,985, or 26 percent.

In 2004, Los Angeles County experienced a record of 1,469 beach closing/advisory days, the highest number in the past 5 years and also the highest among all California counties for the second consecutive year. Following Los Angeles County were Orange County (939 beach closing/advisory days), San Diego County (472) and Ventura County (452). Polluted urban stormwater runoff continues to be the largest source of pollution and the predominant cause of beach closing across the state.

Between 2003 and 2004, the number of beach closing/advisory days in Los Angeles County increased slightly from 1,459 to 1,469, a 1 percent increase following the 60 percent increase during the previous period. Almost 97 percent of total beach closing/advisory days in the county in 2004 were due to elevated bacterial levels from unknown

sources. The remaining three percent were due to preemptive rain advisories, preemptive closing due to known sewage contamination events or reported stormwater sources.

Orange County experienced a 26 percent decrease from 1,329 to 939 beach closing/advisory days between 2003 and 2004, after significant increase during the previous period. Similar to conditions in Los Angeles County, 88 percent of total beach closing/advisory days in Orange County were due to elevated bacterial levels from unknown sources. Ventura County also experienced a 37 percent decrease from 720 to 452 beach closing/advisory days between 2003 and 2004, after significant reductions during the previous period. Among the total beach closing/advisory days, about 62 percent were due to stormwater and 34 percent were from unknown source of contamination.

Solid Waste

Why is this important?

Disposing of waste in landfills is not only costly but, if not treated properly, could have dire impacts on the ecosystem and human health. For example, decomposition of waste in landfills releases methane into the atmosphere, a significant contributor to global warming. Hence, a sustainable society would minimize the amount of waste sent to landfills by reducing, recycling or reusing the waste generated as much as possible.

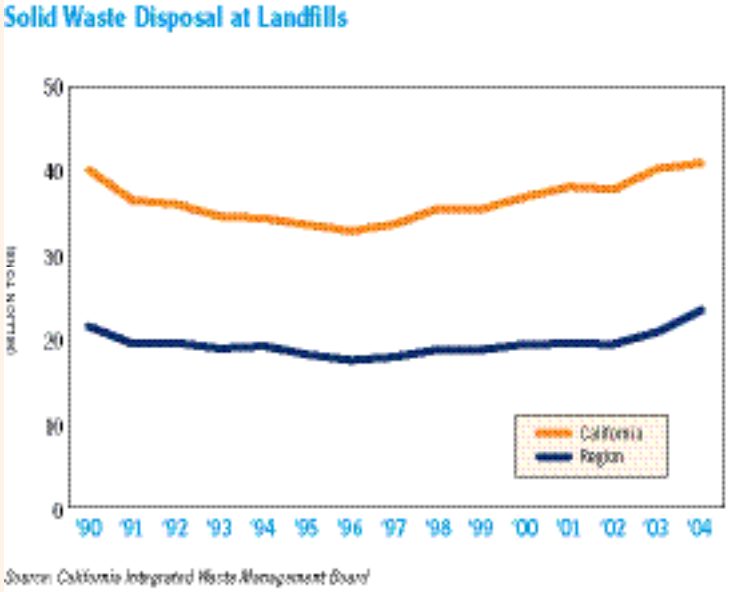
How are we doing?

The 1989 California Integrated Waste Management Act set the goal of 50 percent diversion of each city and county's waste from landfill disposal by the year 2000. Diversion measures include waste prevented, waste re-used, waste recycled or waste composted. Waste diversion programs such as curbside recycling pickups, greenwaste collection, and municipal composting have steadily increased the diversion rate.

At the statewide level, the diversion rate – the share of amount diverted out of the total waste generated - increased from 10 percent in 1989 to 47 percent in 2003, and increased slightly to 48 percent in 2004.[12] Hence among the 78 million tons of waste generated in California in 2004, over 37 million tons were diverted. Among the total waste generated in 2004, about 30 percent was organic matter, 22 percent was construction and demolition materials and 21 percent was paper.[13]

In 2004, the total amount of waste disposed to landfills in the region reached 23 million tons, an increase of 2.5 million tons from 2003. It was also a higher level than any year since 1990 (Figure 61). During the 1990s, waste sent to landfills in the region declined for several years, however, it has increased gradually since 1996. This is similar to the trend at the state level. Many landfills in the region are running out of capacity while environmental concerns make building new landfills or expanding existing landfills increasingly difficult.

Figure 61



Recent growth in construction activities and the challenges associated with diverting construction and demolition debris have contributed to the increase of disposal. The share of construction and demolition materials of the waste stream increased from about 12 percent in 1999 to 22 percent in 2004. Construction and demolition materials include, for example, lumber, drywall, metals, brick, concrete, carpet or green waste related to the development. Of these, metals are the most commonly recycled material while lumber makes up the majority of debris that still goes to a landfill. In March 2004, the California Integrated Waste Management Board adopted a model ordinance, as directed by previous State legislation, to provide information on

methods and activities to divert construction and demolition materials. Reuse and recycling of construction and demolition materials is one component of a larger holistic practice called sustainable or green building construction.

Since the passage of the Waste Management Act in 1989, the region began to make progress in reducing the amount sent to landfills on a per capita basis. In 1990, the region disposed about 8 pounds of solid waste per capita per day into the landfills, higher than that of the rest of the state. Various measures to implement the Act had reduced the per capita disposal rate in the region continuously to just over 6 pounds per day (or almost 25 percent) in 1996, the lowest level since 1990. Between 1996 and 2000, per capita disposal rates fluctuated between 6 and 6.5 pounds per day. Between 2000 and 2004 and particularly after 2002, per capita disposal rate increased and reached over 7 pounds per day, while the rest of the state achieved some reductions (Figure 62).

Figure 62